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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/153,831	09/15/1998	STEVEN J. EBERBACH	94-906CIP	6100
7590 05/19/2005			EXAMINER	
JAMES M DEIMEN 320 N MAIN STREET SUITE 300 ANN ARBOR, MI 481041192			LEE, PING	
			ART UNIT	PAPER NUMBER
			2644	

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/153,831

Applicant(s)

EBERBACH, STEVEN J.

Examiner

Ping Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 22-24 are objected to because of the following informalities: --each of— should be inserted after “creation of” as specified in line 3 of claim 22. Appropriate correction is required.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claim 25 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 2 of U.S. Patent No. 5,809,150. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claimed “said sound field being asymmetric about the axis of maximum amplitude of the sound field” in claim 25 of the instant application is inherently the response of the claimed “skewed hypercardioid energy distribution” in claim 2 of

patent '150; the claimed "maximum amplitude of the sound field" of the instant application is inherently provided by the claimed "major lobe of energy". Although claim 2 of patent '150 fails to claim "at least one electroacoustic driver" as specified in the instant application, "reproducing sound by creating an acoustic energy sound field" in claim 2 of patent '150 is inherently performed by at least one electroacoustic driver.

4. Claims 22-24 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 11 of U.S. Patent No. 5,809,150 in view of Gefvert (5,533,129).

Claim 11 of patent '150 also fails to claim at least one loudspeaker having at least two drivers, at least two channels from an electric signal source and each channels associated with the creation of sound fields from the last two drivers. Gefvert teaches a loudspeaker with at least two drivers (72,76) for creating multidimensional sound fields emanating in non-parallel directions substantially from a point in space in plan view. Since Gefvert does not teach that the driver 72 and driver 76 are different from each other, so one skilled in the art would have expected that the drivers are the same and the amplitude gradient of each sound field versus angle being inherently complementary to the amplitude gradient of the other sound field. Thus, it would have been obvious to one of ordinary skill in the art to modify claim 11 of patent '150 in view of Gefvert by duplicating the sound field created as claimed in claim 11 of patent '150 and forming a loudspeaker with two drivers as taught in Gefvert in order to creating a multidimensional sound fields for the listener.

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5. Claims 1-4, 7-10, 20 and 21 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2-4 and 10 of U.S. Patent No. 5,809,150 in view of Gefvert (5,533,129).

Claims 2-4 and 10 of patent '150 specify a skewed sound field which inherently being asymmetric about the axis of maximum amplitude of the sound field. Claims 2-4 and 10 of patent '150 fail to claim at least two sound fields as specified in claims 2, 4, 8 and 10 of the instant application. Gefvert teaches a loudspeaker with at least two drivers (72,76) for creating multidimensional sound fields emanating in non-parallel directions substantially from a point in space in plan view. Since Gefvert does not teach that the driver 72 and driver 76 are different from each other, so one skilled in the art would have expected that the drivers are the same and the amplitude gradient of each sound field versus angle being inherently complementary to the amplitude gradient of the other sound field. Thus, it would have been obvious to one of ordinary skill in the art to modify claim 2 of patent '150 in view of Gefvert by duplicating the sound field created as claimed in claim 2 of patent '150 and forming a loudspeaker with two drivers as taught in Gefvert in order to creating a multidimensional sound fields for the listener.

Claims 2-4 and 10 of patent '150 also fail to claim a loudspeaker having at least two drivers mounted in the loudspeaker as specified in claims 1, 3, 7, 9, 20 and 21 of the instant application. However, Gefvert teaches how to mount two drivers in a compact loudspeaker. Thus, it would have been obvious to one of ordinary skill in the art to modify patent '150 by mounting two drivers in a loudspeaker as taught in Gefvert in order to provide a compact housing.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-6, 9, 10, 18, 20-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki et al (US 4,860,363).

Regarding claim 25, Suzuki et al (hereafter Suzuki) disclose a method of reproducing sound by creating at least one acoustic energy sound field emanating from at least one electroacoustic driver (30 in Fig. 4), said sound field having at least one maximum and at least one minimum amplitude less than 180° apart (e.g. Fig. 7d shows the response in solid line with a maximum and minimum less than 180° apart) with an amplitude gradient therebetween and said sound field being asymmetric (e.g. Fig. 7d shows the response in solid line is asymmetrical at about 15°) about the axis of maximum amplitude of the sound field.

Regarding claims 22, 1, 2, 10, 18, 20 and 21, Suzuki discloses a sound reproduction system and a corresponding method comprising at least one loudspeaker (30 L or 30R in Fig. 5) having at least two electroacoustic drivers (36L and 34L or 36R or 34R) mounted in the loudspeaker, at least two channels from an electric signal source (although not clearly shown, stereophonic sound source is inherently included to provide signals in two channels to the left and right loudspeakers respectively), each of said channels associated with the creation of sound fields (e.g. Fig. 6 shows the sound

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field created from loudspeaker on the left covering the area from L1A through L2B) emanating from the at least two electroacoustic drivers (e.g. 36L and 34L), said sound fields each having at least one maximum and one minimum amplitude less than 180° apart (e.g. Fig. 7d shows the response in solid line with a maximum and minimum less than 180° apart) with an amplitude gradient therebetween and each of said sound fields being asymmetric (e.g. Fig. 7d shows the response in solid line is asymmetrical at about 15°) about the axis of maximum amplitude of the sound field.

Regarding claims 9 and 23, although not clearly illustrated, said sound fields in Suzuki emanate in non-parallel directions substantially from a point in space in plan view.

Regarding claim 24, although not clearly illustrated in Fig. 7s, wherein over an angle symmetrically located between the sound fields' maxima or minima, the amplitude gradient of each sound field versus angle is inherently complementary to the amplitude gradient of the other sound field in Suzuki.

Regarding claim 3 and 4, Suzuki shows in solid line, for example, in Fig. 7d, that the maximum and the minimum of each sound field is less than 90° apart.

Regarding claims 5 and 6, Suzuki shows a plurality of loudspeakers in Fig. 5.

Regarding claim 12, Suzuki shows that the asymmetry of at least one sound field (e.g. Fig. 7d) is caused by modifying the associated channel signal (Fig. 8) directed to a driver having an axis non-coincident with the axis of maximum amplitude of the sound field.

Regarding claim 13, Suzuki shows that both the sound fields (as in Fig. 6) are produced by the same two drivers (Fig. 4) to produce the mirror imaged sound fields (Fig. 6).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Thurston (US 2,841,648).

Regarding claim 17, Suzuki fails to show amplification after modification. Suzuki's invention was directed to how to modify the signals to the woofer and tweeter. However, one skilled in the art would have expected that the signal applied to the any speaker has to be amplified to the speaker level. Thurston teaches how to provide amplification (14 16) after the modification (18). Thus, it would have been obvious to one of ordinary skill in the art to modify Suzuki in view of Thurston by utilizing amplifier to amplify the signal before it is being supplied to the speaker in order to drive the speaker properly.

10. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki.

Regarding claims 7 and 8, Suzuki shows the response for two octaves, but fails to explicitly show the polar response for at least two octaves. However, based on the response for two octaves, for example in Fig. 7b, the directions of the maxima and minima are retained. Therefore, one skilled in the art would have expected that the direction of the maxima and minima would reasonably be retained over at least two octaves.

11. Claims 1-10, 12-16 and 18-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gefvert in view of Suzuki.

Regarding claims 1-6 and 18-25, Gefvert discloses a sound reproduction system comprising a loudspeaker (10 in Fig. 1) having at least two electroacoustic drivers (11,13,72,74,76) mounted in the loudspeaker, at least two channels from an electric signal source (Fig. 7b), each of said channels associated with the creation of each of said sound fields (Fig. 4A). Although not clearly shown, each sound field has in Gefvert a maxima and minima, and the sound fields are inherently superimposed over an angle symmetrically located between the sound fields' maxima or minima. Since Gefvert does not teach that the driver 72 and driver 76 are different from each other, so the drivers are the same and the amplitude gradient of each sound field versus angle being inherently complementary to the amplitude gradient of the other sound field. Gefvert fails to show the sound field's maximum and minimum less than 180° apart with an amplitude gradient there between, and each sound field being asymmetric about the axis of maximum amplitude of the sound field. Although Gefvert fails to explicitly show any polar response in figures, any loudspeaker would produce a polar response.

Suzuki teaches a loudspeaker with one driver on top of another having a directivity pattern (similar to the one in Gefvert), shown in Fig. 7a, with a maximum and minimum less than 180° apart and each sound field being asymmetric about the axis of maximum (at about 0°) amplitude of the sound field. Thus, it would have been obvious to one of ordinary skill in the art to obtain Gefvert's loudspeaker response in view of Suzuki.

Regarding claims 7 and 8, Suzuki shows the response for two octaves, but fails to explicitly show the polar response for at least two octaves. However, based on the response for two octaves, for example in Fig. 7a, the directions of the maxima and minima are retained. Therefore, one skilled in the art would have expected that the direction of the maxima and minima would reasonably be retained over at least two octaves.

Regarding claims 12 and 13, both Gefvert and Suzuki teach the modification.

Regarding claims 14 and 15, Gefvert shows the center driver (74) being used to produce both sound fields.

Regarding claim 16, Gefvert shows the modification of the associated signal is created by modifying a plurality of other channel signals (col. 5, lines 21-24).

12. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gefvert in view of Suzuki as applied to claims 1 and 12 above, and further in view of Thurston.

Regarding claim 17, both Gefvert and Suzuki fail to show amplification after modification. Gefvert teaches amplification, but fails to provide explicitly the circuit. However, one skilled in the art would have expected that the signal applied to the any

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speaker has to be amplified to the speaker level. Thurston teaches how to provide amplification (14 16) after the modification (18). Thus, it would have been obvious to one of ordinary skill in the art to modify Gefvert and Suzuki in view of Thurston by utilizing amplifier to amplify the signal before it is being supplied to the speaker in order to drive the speaker properly.

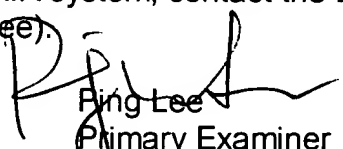
Response to Arguments

13. Applicant's arguments with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ping Lee whose telephone number is 703-305-4865. The examiner can normally be reached on Monday and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh N. Tran can be reached on 703-305-4040. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Ping Lee
Primary Examiner
Art Unit 2644

pwl